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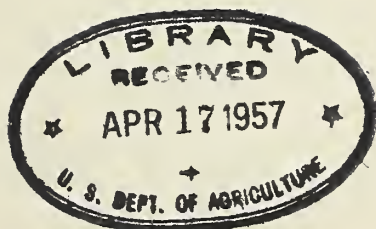


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REPORT OF THE MEETINGS ON FOREIGN ANIMAL DISEASES
ATTENDED BY STATE AND FEDERAL REGULATORY OFFICIALS
DURING FEBRUARY AND MARCH 1955 //

SAN FRANCISCO, - FEBRUARY 17-~~and~~ 18,

MEMPHIS, - MARCH 10-~~and~~ 11,

NEW YORK CITY, - MARCH 14-~~and~~ 15,

CHICAGO, - MARCH 24-~~and~~ 25 //



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Attached is a report of the meetings held to discuss and review plans and organization for coping with foreign animal diseases and the problems expected to arise in the emergency programs. Also discussed were foreign animal diseases with the aid of audio-visual material which is available.

The attached report does not include all presentations made at these meetings; we have, however, drawn from the contributions made by all individuals who have spoken on various subjects at the different meetings.

The excellent contributions made by all speakers are gratefully acknowledged. The contributions made by participants who are not staff members of ARS Branches are especially recognized. The following participated in these discussions and arrangements for these meetings:

Dr. R. A. Bankowski, Davis, California
Dr. W. L. Bendix, Richmond, Virginia
Dr. Carl A. Brandly, Madison, Wisconsin
Dr. A. L. Brueckner, College Park, Maryland
Dr. Vernon D. Chadwick, Jackson, Mississippi
Dr. J. W. Green, Indianapolis, Indiana
Dr. James R. Hay, Columbus, Ohio
Dr. E. P. Johnson, Blacksburg, Virginia
Dr. E. E. Jones, San Gabriel, California
Dr. Erwin Jungherr, Storrs, Connecticut
Dr. K. J. Peterson, Salem, Oregon
Dr. J. V. Smith, Hartford, Connecticut
Dr. James E. Stuart, Sacramento, California

It is hoped that the attached report will be of benefit to you in developing the programs and plans for handling any occurrence of a foreign animal disease which you may have. We urge you to use this material and the visual aids that are available in presenting this material to others in your State. It is especially requested that all veterinarians in the employ of the State and Federal governments be given an opportunity to become familiar with this material at the earliest possible time through work conferences and meetings of veterinarians where these films, slides and other materials can be utilized.

The cooperation of the State livestock sanitary officials in the staging of these meetings is also gratefully acknowledged.

C. D. Van Houweling

PURPOSE OF THE MEETING

By C. D. Van Houweling

As most of you know, the BAI has planned for 10 years or more as to how occurrences of foreign diseases such as foot-and-mouth disease could best be handled if they appeared in the United States. Most of you have had an opportunity to participate in some phases of these programs, which have mainly consisted of determining where certain equipment and supplies could be procured for use in combatting such disease outbreaks.

During World War II and since, there has been a great deal of discussion of biological warfare being directed against the animals of this country. As Dr. Todd and others will tell you, many of these animal diseases are also communicable to man and there are, therefore, good reasons to believe that an enemy might attack this country in that way. Such an attack would not only have the result of diminishing our food supply but also have a devastating effect on the health of the livestock producers whose production capabilities would be taxed to the utmost during times of war.

We have also seen within recent years that we do not have to have BW directed against this country to have new diseases gain entrance. Scrapie and bluetongue are two examples of diseases which have gained entry into this country, apparently through an accidental route, and we all know that other diseases can do the same thing. The spread of vesicular exanthema to 42 States and the District of Columbia once it had left the confines of the State of California is ample evidence as to how fast these infectious, communicable diseases may be disseminated once they gain entrance to our channels of trade.

The BAI - and now the ARS, of course - had and does perform inspections and has regulations to prevent the introduction of foreign diseases. We all know that these precautionary measures are not perfect and that in spite of the best efforts of our inspectors and the best possible use of our limited funds it is possible for infected animals or the contagions of foreign animal diseases to get into this country. In fact, I believe that the last two outbreaks of foot-and-mouth disease resulted from the introduction of garbage from foreign ships even though such was rigidly prohibited.

Recently the FCDA delegated responsibility to the Department of Agriculture for the protection of the nation's crops and livestock from BW attacks. This responsibility was in turn delegated to the ARS and this meeting has as one purpose an attempt on our part to discharge this responsibility. Unfortunately, the delegation did not include the delegation of any funds for this work and therefore activities designed to meet this responsibility will have to be carried on in conjunction with our on-going disease prevention, control and eradication program.

Perhaps this is just as well, inasmuch as we know that these plans that we are making are not only to meet attacks of BW but are just as applicable to cope with the accidental introduction of foreign diseases or unusual occurrences of endemic diseases. In other words, our planning does not strictly pertain to civil defense emergencies but is animal disease control and eradication planning that can be just as applicable during any emergency. Certainly, we have learned that this country does not have to be engaged in an all-out war for us to have problems presented relative to the control and eradication of animal diseases.

We hope to use this opportunity to discuss with you how the State and Federal governments can best cooperate for the rapid extirpation of diseases which may gain entrance to this country, and how we may most quickly receive reports of and diagnose conditions which appear to be new and affect poultry and livestock. We also wish to bring you the latest information we have in regard to a number of these foreign animal diseases, how they may be introduced into this country, what their symptoms and lesions are, how we feel they can best be controlled and eradicated, and what we are doing to get this information out to the livestock producer and the practicing veterinarian.

As I said before, this is not a new venture; much fine work has been done in the past. This is the first time during recent years that we have brought workers together for this specific purpose, and we will, therefore, be reviewing much work that has been done during recent years and attempt to bring everyone up-to-date as to what has been done and what is planned for the future.

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PROBLEMS CONFRONTING US

Not too long ago, we regarded exotic diseases of animals as problems peculiar to Africa, Asia, or South America, or wherever they were located.

Experience in the United States during the past year should convince us that foreign diseases can gain entrance into this country, not only the highly communicable diseases but even those that are spread by and require the presence of an insect vector for their transmission.

We must recognize that an absolute protection against the entrance of foreign animal diseases into this country is impossible. Diseases travel as man and his animals travel -- as they travel faster, infection does likewise. Today's rapid intercontinental air transport, and its rapidly increasing volume, are greatly increasing the hazard of accidental disease transmission. The threat of deliberate spread and introduction of these diseases might also be a factor.

Investigations of past outbreaks of foreign animal diseases in this country have indicated that disease can be introduced and spread, by means of raw garbage (foot-and-mouth disease and vesicular exanthema), contaminated animal feeds (anthrax), and other materials (hides and wool), undeclared importation of cultures (fowl plague), biologics (foot-and-mouth pullorum and anthrax), smuggled livestock and birds (psittacosis), insect vectors (Venz. EE), and animal imported in a carrier stage (bluetongue), or during the period of incubation (scrapie).

The successful discharge of the responsibility of establishing a defense against these threats will depend largely upon the active cooperation of all regulatory officials and practicing veterinarians.

Foreign animal diseases that might gain entrance into this country either by accident or by deliberate acts of sabotage can quickly become widespread among the livestock and poultry unless we are prepared to recognize them promptly and immediately take measures to combat their introduction and apply sound control measures. The outbreak of foot-and-mouth disease in Canada several years ago was a classical example of what might occur in this country. In this case, the disease appeared in a most unexpected location -- in a very remote locality of a central Canadian province -- far from a border point where the disease could have gained entrance. The disease was vesicular in nature and because of its location, it was tentatively diagnosed as vesicular stomatitis. Three months passed by before it was finally confirmed as foot-and-mouth disease. In the meantime, it, of course, spread. This could happen in our own country.

There are other serious foreign animal diseases that could cause the same problems if they made their appearance in this country. We must constantly keep this in mind.

One of the principal problems in dealing with foreign animal diseases is the lack of readily available information pertaining to these diseases, together with the lack of experience in handling them; thus, we must become better acquainted with foreign or exotic diseases and be in a better position to recognize them if they should gain entrance into the country. The prompt recognition and the prompt reporting of the disease, of course, is a primary requirement for successful control and eradication. The sooner the disease is recognized and reported, the quicker action can be taken against it. The speed with which this action is taken will determine, to a great extent, whether the disease can be initially eradicated or whether a slower and more costly procedure of controlling it with the use of biologics and other measures will have to be used.

Another problem in dealing with foreign animal diseases is diagnosis and confirmation. Many times a differential diagnosis will be necessary because for almost every foreign animal disease that threatens the livestock of this country, there is one or more disease already present in this country that presents symptoms that are similar or in some cases identical to them. We must continually keep this problem in mind. The presence or the suspected presence of a disease that might be thought of as a native disease may in reality be masking a more serious foreign plague.

Another problem that could confront us if a foreign or exotic type disease should appear is to acquire information as to how it gained entrance, how it is being transmitted, its hosts, its effects, and its extent. All of this information would have to be gained through epizootiological investigations and such investigations would require personnel experienced in such procedures.

I would like to take a moment and discuss the relationship of this program to the biological warfare threat related to civil defense. The emergency program that we are discussing deals with foreign animal diseases if and when they should make their appearance, whether it be by accidental or deliberate means. The principle of disease eradication and control would remain the same, regardless of the means by which the disease gained entrance. It might be that a disease deliberately introduced and spread might initially pose a greater problem; but nevertheless the procedures in handling would be similar. I do want to emphasize that the threat of the accidental introduction of diseases into this country is with us now and will always exist because of our modern ways of life and especially the rapid means of transportation that we enjoy today.

The use of biological warfare, on the other hand, depends upon international relations and the threat can vary from time to time depending upon these relations. Even if biological warfare were suspected, civil defense does not come into the picture until it is established and announced by the President of the United States. In the meantime, action must be taken and the same animal disease control organizations will handle the outbreak or emergency, regardless of its inception.

MEANS OF INTRODUCTION AND SPREAD OF ANIMAL DISEASE

The introduction and spread of diseases considered foreign to this country is an important problem to not only the veterinary profession but the entire population and bears repeating from time to time to assure that all of us remain alert to the dangers involved. A livestock industry in which animal diseases are controlled or eradicated is necessary to provide adequate essential elements of the diet of both civilian and military personnel. Meat, dairy, and poultry products are an important source of these essential elements of the diet. Other animal products, such as wool and leather, play an important part in the maintenance of the human health. Many of the biologics and pharmaceuticals having wide use in the medical profession, such as adrenalin, liver extract, insulin, etc., are dependent upon an adequate supply of glands, organs, and secretions from healthy animals.

Our problem in maintaining a healthy livestock industry is intensified in this country by the fact that there does not exist here many diseases which are prevalent in other livestock raising countries. We have a particularly susceptible livestock population.

Let us first examine the problem of keeping our livestock free of these diseases by reviewing how they might gain entrance into the United States. We must initially recognize that there are two broad avenues of introduction of dangerous foreign diseases. These are: (1) the accidental introduction, and (2) the purposeful introduction of disease agents. The end result in either case is the same - untold damage to the economy and health of the country.

The importance of measures to prevent the accidental entry of foreign livestock diseases was recognized as early as 1865 when Congress passed the first act to prevent the introduction of disease in imported cattle. The scope of this Act was broadened in 1866 to include control of importation of cattle hides which might be the means of introducing disease. In subsequent years, our import laws have been broadened to permit the sanitary control of animal byproducts, including hides, skins, hair, wool, glue stock, bones, hoofs, horns, bone meal, hoof meal, horn meal, blood meal, meat meal, tankage, glands, organs, casings, or other parts or products of animals which might serve as a disease carrying agent. A notable advancement in the struggle to prevent the entry of foreign animal diseases was the enactment of section 306(a) of the Tariff Act of 1930. This Act further strengthened controls of livestock importations by prohibiting the entry of cattle, sheep, or other domestic ruminants or swine and the fresh meats thereof from countries in which foot-and-mouth disease or rinderpest exists.

As you know, our Government, through the Animal Inspection and Quarantine Branch of the Agricultural Research Service, USDA, maintains at designated ports of entry, an inspection service to prevent, insofar as possible, the introduction of animal diseases. This Service is woefully lacking in manpower, but through the assistance of other Governmental agencies, such as the Plant Quarantine Branch, ARS, the Bureau of Customs, U. S. Public Health Service, and in some cases cooperating State agencies as, for example, in California, a commendable job is done in preventing the accidental introduction of disease carrying agents.

These Services are daily inspecting at our ports of entry many thousands of commercial and private entries to detect and require the proper handling of the various animals, meats, and byproducts. In addition, the adequate control of ships garbage, which often contains trimmings and bones from fresh foreign meats, presents a daily problem to the inspectors. As you know, outbreaks of foot-and-mouth disease in this country have been traced to ship's garbage. A notable example was the 1929 outbreak in California.

Animal feeds have been contaminated by anthrax spores introduced into the country through bone meal from foreign countries. Fowl plague is believed to have entered the country in undeclared foreign laboratory cultures, contaminated biologics have caused outbreaks of foot-and-mouth disease, anthrax, and pullorum, smuggled birds have resulted in the occurrence of psittacosis and insect vectors and animals imported in the carrier stage may have been the means of the introduction of scrapie and bluetongue.

Even with increased and closer inspection at ports of entry it is apparent to all who have studied the problem that prevention of the entry of diseases of animals from foreign countries has become increasingly difficult because of the more rapid movement of man and animals which now prevails. We no longer enjoy the effective travel time barrier which formerly augmented our regulations and prohibitions designed to bar foreign diseases. We no longer can rely on foreign animals developing symptoms of disease during transit to this country should they be infected. The increasing use of air travel markedly improves the chances of accidental introduction of disease.

While on the subject of accidental means of introduction of disease, I should like to point out experiences of World War II when wartime security measures seriously hampered the control over entry of restricted byproducts and garbage from prohibited and restricted meat because of an inability to determine advance ship movements. Also, less than adequate coverage resulted at many of the ports because of an inability to properly allocate personnel in accordance with varied port activities. The problem was also intensified because of a decrease in qualified personnel because of military demands and because of the establishment of many new international seaports and airports. The

foregoing is mentioned here as the same condition will no doubt prevail during any other period of national emergency and advance planning should be done to mitigate insofar as possible this being a means of permitting the introduction of serious diseases.

If this short review has pointed out that preventing the accidental introduction of disease carrying agents is a gigantic undertaking, suffice it to say that it would be practically impossible to prevent the purposeful introduction of such agents. We must recognize that enemy agents could pass our protective barriers with cultures of various organisms or viruses concealed on their person or even in their baggage. This conclusion is inescapable and we must plan our detection, reporting, diagnosis, and control or eradication measures accordingly.

The use of disease against our livestock and poultry industries is not necessarily dependent upon the existence of a state of war. It is conceivable they may be brought into use before such a state exists in an attempt to reduce our ability to resist aggression. This phase of biological warfare is considered as important a possibility as the use of BW after open hostility begins. However, alert livestock and poultry owners and well trained cooperating Federal, State, and practicing veterinarians will serve to minimize the danger.

It is appropriate now to give consideration to the means by which diseases once introduced may spread throughout the country.

Whether introduced by accidental means or through sabotage, it is apparent that a highly communicable disease can and will spread rapidly throughout the livestock population. The very nature of our livestock industry permits this rapid spread of disease because our animals move so widely and freely over the country. Consider the movement from western ranges to midwestern feed lots, to packing centers, and on to the centers of population in the east as meat and other products. We learned from bitter experience how vesicular exanthema, once introduced into major distribution points, could spread to every section of the country. The spread of this disease, while confined by nature to swine, gave us advance warning of what we will be up against should foot-and-mouth disease be introduced. It may become a classical example for those who study this problem.

Included in the problem was the probable original transmission from the foci of infection by meat trimmings in garbage on a transcontinental carrier; the feeding of the garbage in the raw state to swine; the movement of some of these hogs to a biological house in the midwest where the disease was discovered before involvement of the products of the establishment, but not before there was spread to a major stockyards distribution center and to a meat packing center. Infected animals then reached a midwestern swine assembly point and shipments from that farm and the stockyards resulted in spread of infection,

within a matter of weeks, back to California, to the Pacific Northwest, the Eastern Seaboard, the South and the Southwest, in fact, to practically every section of the country. All manner of conveyances were involved in this spread, pointing out the desirability, and in fact, the necessity for thorough cleaning and disinfection of such conveyances after each use. Feed, water, and rest stations became infected and resulted in further spread of the disease.

We all are aware of the effects of the feeding of the raw garbage containing infected parts of carcasses and the fine work which has been accomplished in controlling vesicular exanthema since the widespread cooking of garbage has been put into effect.

When we consider the havoc wrought by the accidental spread of VE, a disease effecting one species, the result of the purposeful introduction and spread of a number of infective agents introduced simultaneously to confuse diagnosis and eradication measures should emphasize to us the necessity for prompt aggressive coordinated action in establishing effective controls once a serious disease is detected. This prompt aggressive coordinated action can be obtained only through diligent prior planning.

In addition to the more or less obvious means of spread of disease mentioned above, all concerned must be alert to the possibility of biological products being used for the purposeful transmission of disease agents. There is also the necessity of thorough checks and controls to assure that these beneficial products are not the means of accidental spread of disease.

Similarly, animal feeds may be intentionally or accidentally contaminated at processing or distribution points resulting in rapid spread of infection. Experience with anthrax in recent years has effectively pointed this out in many states. Rendering plants must be properly supervised to prevent careless and unsanitary practices.

Attention must be given to the part played by sales barns, stockyards, and other livestock assembly points in spread of disease. Unsanitary conditions and improperly handled and inspected livestock from these centers could result in rapid spread of disease whether the introduction was accidental or purposeful.

Less likely than some means of spread already mentioned, but still a possibility, especially in range areas, is the infection of wildlife as a means of spreading disease to other animals. Farmers, ranchers, hunters, and others having contact with wildlife should report to the proper authorities unusual disease occurrence or numbers so investigation may be made as to causative agents involved.

Serious consideration must be given to other means of spread of disease by various insect or tick vectors acting either as an intermediary host or a mechanical carrier. Examples of intermediary host transmission are bluetongue, Rift Valley fever, heartwater, East Coast fever, and cattle tick fever. Also, certain worms and parasites have been found instrumental as intermediary hosts in spreading some diseases, such as, swine influenza and in other cases as mechanical carriers.

The ways that disease may be introduced and spread are many and varied and we have not listed herein all possible means of disease introduction or transmission. Rather, it has been our purpose, in this discussion to point out the most probable and important problems facing us in this field to focus attention on action which should be taken at our ports of entry and in the field to minimize as much as possible, by advance planning, the havoc which can result to our livestock industry, economy of the country, and health of the people through uncontrolled introduction and spread of disease.

PROPOSED STATE, FEDERAL EMERGENCY
DISEASE ERADICATION ORGANIZATION

The veterinary profession has the responsibility for protecting a 12 billion dollar livestock industry. Improvements and progress have been made in many of the methods of controlling and eradicating animal diseases. With modern transportation facilities, many new markets have become available to the livestock industry but at the same time the opportunity for the spread of livestock diseases has greatly increased. The manner in which animals are shuttled back and forth across our country would cause many States to become affected with a disease almost overnight.

There is only one defense that we can take to cope with such a situation and that is to be prepared to take immediate action should some devastating disease appear. Fortunately, we do have a plan that has been tried and proven. This plan was used in Mexico. It is the result of correcting many errors. Its effectiveness is evident with the control and eradication of foot-and-mouth in that country in which many believed it could not be accomplished.

Enclosed is a chart showing the proposed State-Federal Emergency Disease Eradication organization. The CHIEF, ANIMAL DISEASE ERADICATION BRANCH, Agricultural Research Service, United States Department of Agriculture, is shown at the top of the chart since this Branch would coordinate programs in the various states should an emergency occur. The need for such an organization within each State is essential for successful results.

The entire program is focused around the STATE REGULATORY OFFICIAL and the FEDERAL VETERINARIAN IN CHARGE. These two men are responsible for all cooperative animal disease eradication programs in each state; therefore, it is recommended that a special assistant be selected to develop and administer the emergency operations should they arise.

In the event a disease, such as foot-and-mouth, appeared within a state, it is more than likely the governor of the state would declare an emergency. If it is possible to use the NATIONAL GUARD to enforce quarantines and assist in the disposal of infected and exposed livestock, it is suggested that the proper contact be made with the governor's office and a representative of the National Guard selected to be contacted in case of an emergency. The National Guard representative would work directly with the State veterinarian.

LEGAL problems will arise regarding the procedures taken to effectively eradicate and control a disease. Therefore, it is suggested that a legal representative of the State Department of Agriculture be assigned to work with the veterinarian's office.

The chart shows the position of ASSISTANT VETERINARIAN IN CHARGE OF EMERGENCY OPERATIONS. This does not necessarily mean the assistant in charge of the State or Federal departments. It refers to an assistant who would be capable of handling an operation of a large scope.

It is believed the veterinarian in charge of the operations should have a staff of at least three administrative personnel. The following activities would be under their direction:

- (a) ADMINISTRATION, including personnel as well as fiscal matters. This person would have one assistant responsible for the two administrative activities.
- (b) INFORMATION. This is extremely important because diseases of an emergency nature carry a great deal of publicity. Proper handling from an information standpoint can be responsible for avoiding unjust criticism.
- (c) SUPPLIES AND MAINTENANCE. At least two additional persons would be needed to assist with these problems; one handling supplies and the other vehicles.

Careful consideration should be given to the choice of these three individuals since a great deal of responsibility for the success of the program will rest upon them. It would be extremely difficult to carry out an emergency operation without (1) sufficient and qualified personnel; (2) prompt payment of personnel; (3) reimbursement of livestock owners for destroyed animals; (4) adequate supplies to carry out the operations or vehicles to transport operational personnel; and (5) accurate and orderly release of information.

A third level of the chart indicates personnel directly connected with the operational part of the program. INSPECTION AND DIAGNOSIS should be under a veterinarian. He determines the areas to be inspected, frequency of inspection, number of personnel needed, interprets the results of inspections, investigates all reported rumors of disease, as well as being responsible for the actual diagnosis.

MARKETING PROBLEMS may arise and should be handled by a person available to advise the veterinarian in charge of emergency operations on establishing price controls within the quarantine areas, thus discouraging the movement of livestock from areas seriously affected because of the incidence of the disease. Properly handled marketing problems will result in smoothly developed operations rather than creating dissatisfaction on the part of owners and other representatives of the industry.

APPRAISALS of the livestock to be destroyed is an important activity. The individual in charge of this area should be well aware of the market and value of all types of livestock.

CLEANING, DISINFECTION, AND QUARANTINE should be under the supervision of a veterinarian. The prompt establishing of proper quarantines and the speed with which cleaning and disinfecting operations are carried out is an important part of this program. Often times the number of animals involved in an outbreak depends on how efficiently this phase of the operation is carried out.

DISPOSALS should be handled by someone well acquainted with the methods and problems of disposal by slaughter and burial. His knowledge of the types of equipment necessary to do the job is essential.

The smallest unit on the chart is the field unit. This may depend upon the number of outbreaks in the state. It is assumed that each one of these units would handle an outbreak within a given area. It is the unit which would actually carry out the job of disposing of the infection. THE VETERINARIAN IN CHARGE OF THE FIELD UNIT would have a staff similar to that of the veterinarian in charge of the emergency operations, only on a smaller scale, consisting of the following:

An ADMINISTRATIVE ASSISTANT to carry out the personnel and fiscal matters; an INFORMATION ASSISTANT to give out local information when cleared by the man in charge of the information at the central emergency operation level; an ASSISTANT FOR SUPPLIES AND VEHICLES used to control and eradicate the disease in the area; a veterinarian in charge of the INSPECTION AND DIAGNOSIS teams operating in the area; a man in charge of APPRAISALS AND MARKETING; a veterinarian in charge of QUARANTINE, CLEANING, AND DISINFECTION; and a foreman in charge of HEAVY EQUIPMENT necessary to carry out the animal disposal operations.

In the past similar measures have been discussed with you. However, we are now trying to stimulate the operations from paper into actual operation. We are recommending that you review the personnel in your state and Federal operations and arrive at a conclusion as to which individuals would be selected to handle each category shown on the chart in case an animal disease of an emergency nature should appear in your State. If we work together to place such an organization into effect, we will be prepared to handle any disease, should it appear.

The Area Directors attached to the Animal Disease Eradication Branch, in future visits to your station, will consult with you relative to this organization. Emergencies have appeared in the past, they may appear again at any time. To help prevent unnecessary loss of livestock and food in future disease outbreaks, we must be prepared now to recognize them and act immediately.

STATE-FEDERAL EMERGENCY DISEASE ERADICATION PLANS

I am sure that most of you, during World War II and shortly thereafter, were aware of, or actively participated in, the work of certain organizations designed to guard our livestock industry against the threat of Biological Warfare directed at our food supply and otherwise being of a Civil Defense, or related, nature.

The present proposed State-Federal Emergency Disease Eradication organization is a continuation of previous work along this line and is designed as a framework about which, in each State, there may be set up a practical operating organization of trained and alert personnel ready at a moment's notice to take over and operate as a self-contained unit under the supervision of the State Regulatory Official and Federal Veterinarian in charge. The disease in point may be one of cattle, sheep, goats, equines, swine or poultry and may be a foreign or exotic disease or it may be a domestic condition that, for one reason or another, calls for an emergency type of operation which falls more nearly within the province of the Emergency Disease Eradication organization than it does directly under the respective State and Federal officials within the State where the emergency exists.

This proposed organization is not designed to lessen the authority or responsibility of the State and Federal officials in the State concerned but merely to give them an added tool in order that they may handle the emergency more quickly and more efficiently.

We can all appreciate that without such an organization, already functioning and capable of mobilizing for immediate action, the early, so-called "golden hours" in which the disease might be eradicated before it becomes widespread may be lost and necessitate a long-drawn-out and more costly program.

It is hoped that each State may prepare its own chart along these lines, selecting personnel and placing their names under the responsibilities indicated. It is hoped that officials will regularly meet with the organization, keeping them on a READY-RESERVE STATUS.

The control and eradication of some diseases is relatively simple, and others of course much more difficult. The eradication of diseases in which wild animals, other species of domestic animals and birds act as reservoirs and insects act as vectors may be extremely difficult.

FOOT-AND-MOUTH DISEASE

In the 1924 outbreak in this State large numbers of deer became infected and had to be hunted down and killed.

Origin of Outbreaks in the United States:

1870-1880-1884 -- by imported animals.

1902 -- imported products.

1908 -- vaccine from Japan.

1924-1929 -- garbage from ships of foreign origin.

1914-1924 & 1925 -- unknown.

BLUETONGUE

We are presently confronted with the problem of a vector (Culicoides) and the possibility of an unknown reservoir or reservoirs.

GLANDERS

In World War I, enemy agents succeeded in infecting Army horses with this disease.

It is interesting to know that insects have been found in the stuffing of imported dolls. These could have been vectors of some disease. (Tick specimen taken from a live snake found in Denver, Colorado, in a shipment of bananas from South America was shown here).

One might think that we are digressing from our subject, the discussion of the emergency disease eradication organization. Actually this is not the case as the man you choose as Assistant Veterinarian in Charge of Emergency Operations must be fully cognizant of the various aspects and possibilities of the many situations which may eventually directly affect him and cause his organization to fulfill its mission of the emergency eradication of a disease in this country.

ASSISTANT VETERINARIAN IN CHARGE EMERGENCY OPERATIONS

To be selected by State Regulatory Official and Federal Veterinarian in Charge.

1. May be any full-time State or Federal Veterinarian stationed within the State, capable of assuming the responsibilities, under your direction, of keeping this organization on a Ready-Reserve Basis and of Supervising its operations during the emergency for which it has been formed and maintained in an alert and ready status.

ADMINISTRATION PERSONNEL FISCAL

A person capable of handling this important phase of the program with a broad understanding of Personnel and Fiscal problems, particularly on an emergency basis.

INFORMATION

Also a very important position. The Department has certain key information personnel stationed at different points throughout the country which have been trained to assist you in this regard and who are available for assignment when the need arises to aid your employee assigned to information responsibilities. As you know, the newspaper reporters are where the news is released; if you don't want them at the scene of operations (and you probably won't), the news is best relayed to your office and released by you. This person will arrange for news conferences, etc., to assure an orderly flow of factual information to dispel the many rumors which are bound to be prevalent.

SUPPLY & MAINTENANCE SUPPLIES VEHICLES

This employee should arrange to know the several locations where supplies are available, locally if possible, and in what quantities, etc. This also applies to heavy equipment for digging operations. Perhaps arrangements can be made with the State Highway Department in this respect.

He should have located a ready source of supply for disinfectants, protective clothing, spray pumps and other materials, particularly those which will be needed for inspection personnel and for establishing quarantine road blocks, etc.

INSPECTION & DIAGNOSIS

A veterinarian, particularly one with vesicular disease experience.

MARKETING PROBLEMS

At this particular level you may have noticed that marketing problems have been separated from appraisals. This was thought advisable in view of the fact that a great deal of effort will be required to provide safe methods that will enable, where possible, livestock to go to market and thus decrease pressure on quarantine lines.

APPRAISALS

An individual with some experience and a knowledge of livestock values would, of course, be preferred.

CLEANING - DISINFECTION - QUARANTINE

A veterinarian trained along these lines.

It appears from comments from the public that much educational work still needs to be done in requiring that our own personnel clean and disinfect their shoes and equipment when going from farm to farm on routine assignments.

DISPOSALS

A person experienced in the use and capabilities of the necessary equipment, etc.

QUARANTINE & GUARD DETAILS

In the case of our more explosive diseases, a written quarantine notice and the word of the owner that he won't move infected or exposed animals or otherwise violate the provisions of a rigid quarantine is unfortunately not 100 percent effective. Even the most honest and conscientious man may attempt to save valuable or pet animals by moving them out of the danger zone and so spread the disease. Particularly in this country do we need National Guard personnel, police officers or officials of the sheriff's office who represent to the Public individuals who have a recognizable official capacity and who have a legal right to enforce quarantine. Advance liaison should be maintained with such groups so they may be available on short notice.

THE LOCAL PRACTITIONER AND VETERINARY ORGANIZATIONS

The local practitioner, with his experience and knowledge of the usual diseases and the normal incidence of the diseases in this community, will in all probability be the first person to realize that there is an unusual increase in cases of a disease or that a new type of disease may be present.

This program, if it is going to be of much practical value, should be carried to the practicing veterinarian. One of the best ways to do this is by means of films and other visual aids. We have some excellent films on domestic and foreign diseases; however, to be most effective, those films should be shown on a local level where they are available to all practitioners and to field State and Federal personnel. Our visual aids have been widely shown at various meetings over the country, but I believe the State-Federal Emergency Disease Eradication Organization has a fertile field in using these visual aids at Veterinary Schools and at small local gatherings of veterinarians and other interested persons.

CONTROL AND ERADICATION OF FOREIGN ANIMAL DISEASES

I. PUBLIC RELATIONS

General information concerning the dangers and common symptoms of foreign animal diseases should be widely disseminated. Information to livestock owners should stress the importance of immediately notifying the local practicing veterinarian, county agent, or State and Federal authorities whenever suspicious symptoms appear within their livestock and poultry.

Every reported suspicious case should be promptly investigated. This will encourage the livestock owners to report unusual conditions. Only qualified personnel should make investigations of suspicious cases. Immediate action is the only way that will avert a major catastrophe in the event a suspicious condition is diagnosed as a dangerous foreign disease.

II. COOPERATIVE EFFORTS OF PRACTICING VETERINARIANS

Since relatively few practicing veterinarians have actually seen these foreign diseases, it is important that we continually stress the importance of reporting suspicious or unusual disease conditions. Visual aids, including movies of unusual or foreign animal diseases, is a good means of providing information. Movies are available for showing at area meetings of veterinary associations and to groups of livestock owners. Discussions of these diseases will sometimes bring forth information concerning a peculiar condition which the practicing veterinarian may be seeing or has heard of from his clients or colleagues.

III. PRIMARY INVESTIGATIONS OF SUSPICIOUS CASES REPORTED

Every report of a suspicious disease should immediately be investigated by a regularly employed State or Federal veterinarian. Veterinarians making such investigations should use the utmost precautions in cleaning and disinfecting their protective clothing and equipment before entering and before leaving premises. Suspicious premises should be quarantined immediately to prevent possible spread of the disease.

IV. DIAGNOSIS OF SUSPICIOUS CONDITION

A specially trained diagnostician should be called immediately to make a differential diagnosis on each suspected condition. If test animals are needed, they should be purchased at a point well away from the suspected premises to help assure that they are not infected or immune. Test animals should be inspected prior to purchase.

Should a diagnosis of an exotic disease be made, the premises should be quarantined in such a manner as to prevent people, vehicles, susceptible animals, susceptible animals' products, milk, feed, straw, hay, feed containers, or other possibly contaminated materials from leaving the premises.

Investigations should include information concerning purchases and sales in herds or flocks within the past ten days plus the names and addresses of all owners of trucks that have visited the premises.

No specimens or samples should be moved off the infected premises without specific authorization of State and Federal authorities. Guards should be posed around infected premises just as quickly as possible to enforce quarantines.

V. EMERGENCY DISEASE ERADICATION ORGANIZATION

As an example, when a positive diagnosis of foot-and-mouth disease is made, State and Federal cooperating officials will activate the Emergency Disease Eradication Organization.

The ASSISTANT VETERINARIAN IN CHARGE OF EMERGENCY OPERATIONS will immediately set up his organization in accordance with the prearranged plan.

The staff members of the emergency operations section will organize their functions to service the field units immediately. Staff officers for inspection and diagnosis, marketing problems, appraisals, cleaning, disinfection, and quarantine and disposals will proceed with their prearranged functions.

VI. FIELD UNIT

A. Inspection and Diagnosis

The veterinarian in charge of the field unit section should take immediate steps to prevent the spread of the infection and promptly organize the operation to eradicate the disease. The quarantined area should be mapped out and divided into sections. A veterinarian should be assigned to inspect all premises within a given section.

Investigations must continue until the source of the infection is determined, all exposed animals found and inspected, and the extent of the disease known.

B. Quarantine

1. Infected premises (including the occupants, susceptible animals, milk, animal products, feed stuffs, straw, feed sacks, etc.) will be held under strict quarantine. Pets, such as dogs and cats, must be confined. All clothing of personnel entering or leaving premises must be thoroughly cleaned and disinfected prior to departure. Clothing and footwear should be furnished at the entrance to the infected premises, so that personnel authorized to enter can change before entering and prior to departure.
2. A quarantine line should be established around the periphery of the quarantine zone so that animals and restricted materials and animal products can be prevented from moving from the zone. A cleaning and disinfection station must be established at each road junction leading out of the quarantine zone to facilitate approved movements of persons and material.
3. Cleaning and disinfection stations must be established at all railroad stations, bus stations, and airports within the zone of operations.

C. Heavy Equipment

The representative designated to handle heavy equipment should arrange to have equipment and personnel to operate it at the site of operations just as soon as possible. Dimensions for the size of trenches needed to properly bury the infected and exposed animals will be furnished by the veterinarian in charge of the disposal operations. Digging equipment will be thoroughly cleaned and disinfected by regular cleaning and disinfecting personnel prior to movement from infected premises.

D. Appraisals and Marketing

The appraisal and marketing representative will be responsible for appraising the infected and exposed animals. He must obtain the approval of the appraisal from the owner prior to their slaughter. He is also charged with handling the marketing problems which arise as the result of the quarantine established in the quarantine and the buffer zone.

E. Disposal of Infected and Exposed Animals

This will be under the direction of the veterinarian in charge of the field unit.

F. Incising and Liming Carcasses

Cleaning and disinfection personnel are responsible for incising the carcasses and covering them with lime.

G. Cleaning and Disinfection of Infected Premises

Cleaning and disinfection personnel are responsible for cleaning and disinfecting the infected premises as well as those premises where exposed susceptible animals have been removed. This is a very important part of the program and the thoroughness in which premises are cleaned and disinfected cannot be overemphasized.

H. Premise Testing

Infected premises should be required to remain free of susceptible animals for thirty days following cleaning and disinfection. Test animals are placed on these premises for an additional sixty days. If these animals remain healthy, the owner can begin to restock.

Quarantine of the infected premises and the quarantine zone may be removed when the disease is considered eradicated.

INSPECTION AND QUARANTINE AT OUR PORTS OF ENTRY

About 100 years ago, a British vessel with the name of George Washington docked in the Port of New York, almost opposite the window of our office at 45 Broadway. On this ship were some cattle which had been brought along to furnish milk and food for the crew members and passengers. The particular cow that furnished the milk had gone dry so that the master of the vessel proceeded to take the cow off the ship to a rural district then known as The Bowery where he traded this cow for a fresh cow. This transaction being done he returned to the ship and sailed away. The cow he traded, however, was infected with contagious pleuropneumonia which spread rapidly over the United States, particularly the eastern seaboard and as far west as Ohio, and for a number of years this particular disease was the scourge of the infant livestock industry in the United States.

Luckily, even in those days, there were people farsighted enough to consider the eradication of contagious pleuropneumonia of grave importance and in about six or seven years after the program was started, this disease was eradicated from the United States. The introduction of this particular disease into the United States in this manner is a situation which could not occur under our present laws and regulations.

In 1884, the Congress established what was formerly known as the Bureau of Animal Industry and provided for certain quarantine stations to be established at the several ports of entry to guard against just such an occurrence. Since that time, our work has taken on considerable more activity in that we are not alone concerned with the introduction of live animals from known infected areas but also with the possibility of the introduction of diseases through the importation of the following products:

Hides, skins, wool, bristles, etc.

Fresh, chilled or frozen meats - cured meats.

Hay and straw packing materials around glassware and china.

Control of glands and organs that are used for pharmaceutical use.

Animal stomachs, such as hog stomachs, from which pepsin is extracted; and rennets for the manufacture of cheese.

Animal manure and fertilizers.

Used meat covers and burlap that has been used in infected countries for the covering of meats.

All classes of live animals of ruminant, swine, poultry and equine families.

Meats in passenger baggage, meats in cargo on ships and planes; so-called gift packages at the post offices and express offices; meats in ships' stores and meals on planes.

Garbage from ships and airplanes.
Biologics - vaccines - serums.
Skin serum and various hormone and glandular substances used in the manufacture of cosmetics.
Disease cultures for experimental purposes and laboratory use.
Blood samples for colleges and laboratories that might be used for blood typing.
Shipments from foreign countries of personal effects and foodstuffs that might be shipped under diplomatic immunity, even shipments on Army and Navy planes which had been intercepted because they were bringing fresh meat from foreign countries to the United States.
The control of the introduction of animal secretions, semen, and musk.

It will be interesting for you to learn that since the end of World War II there has been a great movement of people between the United States and Europe - people who have been going back to the homeland or people who have been coming to visit relatives here and it would seem for a while that most everyone in foreign countries thought that we here in America were hungry for meat and for that reason they brought great quantities of dried sausages, salamis, and other meat delicacies in their baggage which Customs seized for us for disposal. We have in the past seized as much as 160,000 pounds of meat out of passenger baggage in one year and currently we are taking from 3 to 4,000 pounds a month. This product is potentially dangerous because most of these sausages are made from ground beef, pork, and veal - seasoned, dried, and not cooked. The danger lies in the fact that a lot of our people would disdain eating such a product and when the friends and neighbors have gone they throw it in the garbage can and there is the grave danger of the herds of raw garbage feeders becoming infected.

With the introduction of the airplane into the handling of livestock movements, we are faced with graver problems than we have ever been in the past. Most shipments coming from Europe, Asia, and Africa would take from 15 to 40 days by boat and, in most instances, we would have knowledge of disease prior to the arrival of the ship and could properly control the arrival of the animals. However, today we receive about 95 percent of all poultry importations by air and about 75 percent of the horse importations by air and great numbers of cattle and zoological animals - the flight time of which is about 12 to 14 hours. This, you will understand, adds to our responsibility as exposed animals might not have had an opportunity to develop symptoms of a disease prior to the landing but still would be infected unless we had adequate quarantine facilities.

We are encountering considerable difficulty with the various research establishments who are using serum as a base for numbers of their experiments, which they receive from foreign countries, and, of course, these must be held up until we are satisfied that the serum used was not of ruminant or swine origin or have been heated to a temperature which was safe for introduction into this country.

You might be interested in knowing that there have been times at the port of New York when as many as four million wet salted cattle hides have been imported during a month's period from infected countries and these must be handled off the ship, across the pier to sealed cars, trucks and lighters and sent to tanning establishments that are operating under the supervision of this branch for the disinfection of such hides and skins.

POULTRY DIAGNOSTIC PLAN

Dr. Simms called a meeting of collaborators on foreign poultry diseases in Washington on November 16 and 17, 1953. The committee consists of six regional men, each representing several states throughout the United States, who are devoting much of their time to diagnosis of poultry diseases. Also, there are several officials and research men representing the Agricultural Research Service of the United States Department of Agriculture.

The purpose of the meeting was to study a survey of the existing diagnostic facilities and capabilities of laboratories to meet an emergency; to develop acceptable procedures and to provide qualified consultative service where it is inadequate. The discussion of the accidental or intentional introduction of exotic poultry diseases brought out evidence of less knowledge and regulatory measures in diseases of poultry than in other livestock. Much of the disease work in poultry is done in diagnostic laboratories and research stations. There is need for coordination and harmony between regulatory officials and the laboratories to be well prepared for biological warfare in poultry.

Although the results of a previous survey by mail-questionnaire on the "Facilities for Laboratory Diagnosis of Poultry Diseases" as of July 13, 1951, were available, it was the consensus of the collaborators that many changes had taken place since the last survey and that a personal survey would yield more adequate information. In accordance with this recommendation, the Animal Inspection and Quarantine Branch, ARS, USDA, initiated such a survey on a regional basis under the leadership of Dr. L. C. Heemstra in August 1954 and asked Drs. E. M. Dickinson for the Northwest, E. S. Jones for the Southwest, J. P. Delaplane for the South Central, C. A. Brandly for the North Central, E. P. Johnson for the Southeast, and E. L. Jungherr for the Northeast areas to serve as regional coordinators.

The results of the survey have indicated that there is much progress in providing diagnostic facilities throughout the country. Most of the laboratories have plans for future expansion, some of which are to be achieved in a short time, others in the foreseeable future. Rapid developments of new diagnostic facilities have taken place during the past year that make the attached map already out-dated.

The poultry diagnostic laboratories in the United States have been evaluated, particularly in regard to their fields of special study, personnel, equipment, and other facilities for disease diagnosis. This has been done with the idea of developing a plan of action for the early and accurate diagnosis of foreign and domestic diseases of poultry having peculiar aspects.

For the purpose of coordinating a plan of action, the United States has been divided into regions. Each region is headed by a competent and recognized poultry pathologist who coordinates the diagnostic activities in his region. Certain laboratories have been designated as key laboratories because of facilities available for particular diagnostic procedures not common to all laboratories.

The tendency toward establishing new branch laboratories in some states has the advantage of bringing the diagnostic facilities closer to the centers of the poultry population. This does have a disadvantage, however, in that it limits the diagnostic scope of the smaller laboratories.

The diagnostic laboratories with extended research facilities seem to be the best equipped at the present time to carry out the multiple diagnostic tests required in a modern poultry disease service. Furthermore, under intensive production methods, apparently new disease entities are constantly recognized, such as air sac, hemorrhagic syndrome, and infectious synovitis, all of which bear some resemblance to known exotic poultry diseases and need for their diagnosis the full armamentarium of a well-rounded poultry diagnostic service.

Ornithosis is seen as a new threat to domestic poultry but very few laboratories are adequately prepared to conduct studies on this condition. From the standpoint of diagnosing exotic diseases promptly, practically all laboratories realize the need of adequate self-contained isolation facilities which would permit clinical observation, gross pathologic studies, diagnostic inoculations, and final safe disposal without danger to the vicinity. Provision of such isolation facilities at least in designated regional laboratories should be the immediate concern of the regulatory officials on the State and Federal level.

When new or unusual poultry disease conditions are encountered they should be referred to the nearest diagnostic laboratory since in most instances only the laboratory is in a position to make a definite diagnosis. The State livestock sanitary official should immediately be notified. Likewise, the State livestock sanitary officials involved should be kept informed of the transfer of specimens and other material from one laboratory to another for diagnostic purposes. Directors at laboratories will work with regional coordinators in diagnosing conditions which may be beyond the scope of a given laboratory. It shall be the responsibility of laboratory directors and regional coordinators to keep disease control officials advised as to suspicious conditions which are being investigated.

RESEARCH IN THE VESICULAR DISEASES

It is difficult to select any single contribution to research on the vesicular diseases as the most important. All contributions, however small, which have been submitted during the past decade, have materially increased our understanding of the agents per se and the diseases they produce.

A quick and accurate diagnosis is one of the most important steps in the control of this group of diseases. A method other than the animal inoculation technique has been uppermost in the minds of those interested in this field. Recent advances in the field of diagnosis have been made through (1) serology, (2) cultivation of the virus in tissue culture, and (3) uncovering laboratory animals susceptible to the vesicular viruses. Since the time for discussion is limited, I will review some of the newer knowledge which may be of particular interest and application to the veterinarian in the field.

SEROLOGY

In the realm of serology, Galloway, Brooksby, and Henderson of the Pirbright Laboratories in England, deserve much credit for stimulating research and applying the recent advances in the complement fixation test (CF) to develop a test that will not only identify but also differentiate the virus in field material into its immunological type of foot-and-mouth virus (FM). The test will also differentiate FM from vesicular stomatitis (VS). They further adapted the test to differentiate quantitatively between strains of FM agent within the same immunological type. For example, they showed beyond doubt that the strain of FM from the Mexican outbreak was indistinguishable from the Valle' type A virus; however, it displayed some differences in antigenic structure from the Valle' type A that was isolated from an outbreak in England.

To prove that some differences existed between the Mexican and the English Valle' type A of FM virus, hundreds of animals were used in numerous experiments. They definitely showed that the Mexican strain was not as invasive as the English. During their experiments, in which inoculated animals were kept in contact with susceptible animals, a surprising number of cattle did not become clinically infected with FM disease. Some of the animals that appeared normal during the entire experiment suffered from a subclinical or inapparent infection and became immune, whereas still other cattle remained susceptible after a two-and-a-half week period. Cattle inoculated with the Mexican strain did not show as high a titre of the virus in the blood as those infected with the English strain, nor did the animals show as high a neutralizing antibody response to inoculation. Of the many differences found between these strains, the most important was that vaccines prepared from the English or the Mexican strain produced

excellent protection against its homologous strain of virus, but the vaccine prepared from the English strain of virus did not protect cattle against infection with the Mexican strain. This serological technique, therefore, is an important adjunct, not only as a diagnostic tool to identify an agent involved in the vesicular condition but also as a clue to the nature of the virus involved.

CF tests for identifying and differentiating vesicular diseases have been developed in the United States for the detection of both vesicular stomatitis and vesicular exanthema viruses.

Although these tests appear to be an answer to our diagnostic problems, the time-consuming and more cumbersome technique of animal inoculation cannot be entirely eliminated. For example, the complement fixation test, which has been applied to field samples obtained from outbreaks in Great Britain, has shown that only 58% of the samples submitted from the 1947 - 1951 outbreak could be directly identified. In a second outbreak, which occurred between 1951 and 1952 (8 months), 82% of 211 samples submitted were typed by the CF test. No explanation could be given for the higher percentage of samples that were successfully typed during the second outbreak. The answer may lie in some feature of the natural history of the disease at this time. It may be that the shorter intervals in the natural passage of the virus associated with the more frequent outbreaks, which occurred in the latter outbreak, favored the production of lesions containing or supplying a good source of material, or the characteristics of the strain of virus involved may play a part.

Similar results with the serological test have been obtained with the material submitted from outbreaks of vesicular exanthema in California. In these cases, however, material harvested from hogs is usually held by the veterinarian, presumably under good refrigerated conditions, until the test animals prove that the disease is not FM. The efficiency of the complement fixation test for the identification of VE virus might be increased by eliminating this storage period, and submitting the material for test immediately.

During the past six months, workers of Plum Island introduced a simplified test for the identification of vesicular stomatitis. This technique eliminates some of the cumbersome titrations of the many components necessary to the complement fixation tests. Whether this simplified test can be applied to the identification and differentiation of all three of the vesicular diseases is not yet known.

TRANSMISSION OF VESICULAR EXANTHEMA

Since June, 1952, when vesicular exanthema was identified beyond the borders of California, considerable work has been directed towards this infection. During the past few years, a considerable amount of information has been accumulated which should be reviewed at this time.

The origin of vesicular exanthema is still unknown; however, the disease is known to spread under field conditions by at least two methods: by direct contact and by feeding raw garbage containing the agent. With regard to duration of infectivity of hogs suffering from vesicular exanthema and modes of transmission, the work done at Beltsville, Maryland, by Dr. L. O. Mott and his group is of particular interest.

Direct contact experiments. In the first experiment a large number of pigs were inoculated intravenously with a heavy suspension of VE virus. Average time for the febrile reaction to develop was 34.8 hours, for the first lesions to appear, 46.8 hours; thus, the average time between the first temperature rise and the first lesion was about 12 hours. To determine when and for how long swine infected with VE actively disseminated the virus, two infected pigs were placed in a pen with two normal swine, one of which was scarified on the snout and on the pads of the front feet. This procedure was repeated, using inoculated swine 12, 24, 36, 48, 72, 96, 120, and 144 hours after inoculation. The susceptible animals contracted the disease from pigs inoculated between 12 and 120 hours previously, but not when the period between inoculation and contact was greater than 120 hours. It was believed, therefore, that the pigs did not excrete the virus or were no longer infective 120 hours after inoculation. This was confirmed by inoculating several pigs with VE virus, putting them with two normal swine in a clean pen, and leaving them there for 12 hours. After 12 hours, the two infected pigs were removed and placed in another pen containing two susceptible hogs. This process was repeated at 24, 36, 72, 96, 144, and 192 hours after inoculation. The inoculated pigs showed clinical VE 48 hours after inoculation; the animals with which they came in contact were positive in the 24-, 36-, 48-, 72-, and 96-hour trials but not in the 12-, 144-, and 192-hour trials. From these experiments, it appeared that swine began to shed virus 12 hours before the appearance of vesicles and continued to shed the virus from 84 to 108 hours after vesicles appeared. At either end of the viral elimination period, some contact pigs failed to show lesions but developed an immunity. Similar experiments have been repeated and the authors have never had a contact pig develop lesions when the contacts were added over 100 hours after the appearance of vesicles.

These and other experiments indicated a direct correlation between dosage and degree of reaction in exposed animals. The average temperature rise in normal pigs placed in contact with infected ones was found to be consistently slower than fever in inoculated pigs. There also was a difference in the incubation period between the contact and infected animals. The incubation period of the recipient pigs was significantly shorter while the donor pigs were developing lesions (they were shedding large amounts of virus) but was prolonged when susceptible pigs were in contact with donors in later stages of infection.

Although in all of these experiments the skin of the feet and snout of one pig of the contacted animals of each group was scarified, no

significant difference could be seen between the spread or degree of reaction in hogs that were scarified and those that were not. This seriously raises the question of whether the virus is spread primarily by contact with the susceptible epithelium of the snout and feet, where primary lesions are observed, or by some other means.

Indirect contact experiments. In another series of experiments to determine the infectivity of environment, two normal contacts were placed in each of eight infected pens 0, 1, 2, 3, 4, and 5 days after removal of the infected swine. Only one of the normal contacts developed lesions. Subsequently, it was shown by challenge that both animals in the 72-hour group and one of the animals in the 0-hour group had been exposed to the virus. This erratic pattern of infection by indirect exposure substantiates Dr. Crawford's observations that it is quite difficult to spread the virus by indirect contact.

These results are in a way surprising, and if we can assume that all strains and types of vesicular exanthema virus behave similarly, raw garbage must be the principal vector in the spread of this disease. This statement is substantiated by additional experimentation by Dr. L. O. Mott and his group at Beltsville, proving that susceptible swine can be quite easily infected with vesicular exanthema when fed swine tissues from animals in the acute stages of the disease. Nearly all body tissues from infected swine obtained before clinical lesions were evident, as well as after the appearance of vesicles, transmitted the disease. Here again, a direct correlation was observed between the size of the infective virus exposure dose and the length of the incubation period. The greatest virus concentration was contained in the snouts, skin, and feet (both before and after vesicles developed). If the virus is found in lower concentrations, some susceptible animals may have become infected without showing clinical evidence of the disease and may have eventually become immune. Subclinical infections, which may be produced by small subclinical virus dosages, old weak virus samples, or attenuated virus suspensions, may account for outbreaks in which only a very small percentage of the animals show clinical manifestations of the disease.

Effect of storage of vesicular exanthema infected tissue on infectivity. Vesicular exanthema virus seems to remain viable for long periods when infected swine tissues are stored at ordinary refrigeration ($7^{\circ}\text{C}.$). All swine tissues remained infective after storage for one month, although these tissues showed marked decomposition after two weeks' storage and gross putrefaction changes occurred after one month. This would indicate that decomposition changes of meat scraps in garbage would not affect the virus unfavorably. Infective tissues stored at $-70^{\circ}\text{C}.$ remain infective for 18 weeks. These results emphasize the potential danger of new disease outbreaks in clean areas into which garbage containing infected pork scraps held in cold storage for months is introduced and fed to susceptible swine. It was interesting to note in these experiments that 30% of the animals fed infected swine tissues

developed lesions without showing elevations in temperatures. This phenomenon has also been noted in our laboratory in pigs inoculated with virus suspensions.

These experiments adequately substantiate the belief that garbage is a good medium for the preservation of this virus and provide evidence to indicate the high incidence of subclinical infections which exist with this disease. What part subclinical infections or carriers play in the spread of this disease is still unknown and is of considerable importance in the control of vesicular exanthema.

EPIDEMIOLOGICAL STUDY OF VESICULAR EXANTHEMA

To investigate more thoroughly the nature of VE, samples of infected swine tissue obtained from outbreaks in California have been submitted to the University by veterinarians of the regulatory agencies since October 1951. Thus far 319 samples have been received for typing. During this period, five immunologically distinct types of the virus have been recognized. The last type, isolated and designated as type E54, was obtained from an outbreak in Warm Springs, California (Alameda County), on July 20, 1954.

The disease was almost endemic in certain areas of the state. Since one of these areas was the Bay Region, not too far distant from the university, particular attention was given to outbreaks occurring in this region. At this time, I wish to express my appreciation to Drs. C. E. Taylor, O. W. Sommer, E. V. Edmonds, and C. J. Claire for their cooperation and efforts to obtain suitable samples for this project.

During the period of October 9, 1951, and January 15, 1955, 114 outbreaks were recorded in this area; material from 89 (78.9%) of these outbreaks was submitted for testing.

It is interesting to observe a definite pattern or trend in the occurrence of the virus. Table 1 shows that during the period of October 1951 through July 1952, all samples tested indicated that the outbreaks were due to type B VE virus, but that during September and December 1952, the outbreaks were due to another immunological type (type C); the outbreaks reverted to type B again during the ensuing wave of outbreaks during the next 12 months (January through December, 1953). In the following five-and-a-half weeks, seven outbreaks, all of which occurred in one county, were predominantly due to type C VE virus.

Beginning in February 1954, a new wave of 33 outbreaks struck the Bay Area hog ranches. In this case, type D predominated; three outbreaks were due to type B and C. The latter outbreaks cannot be explained at this time; however, they all occurred in the early period of the enzootic. The fifth immunological type of virus (type E54) was isolated in Alameda County in August 1954. In our testing procedure, isolation

of a new type requires revamping the existing test to include the new type of antiserum. The production of hyperimmune serum is time-consuming, which accounts for the delay in differentiating the 17 samples. It is possible that the enzootic during this period may be further subdivided between the predominance of types D₅₃ and E₅₄ between February 26, 1954, and January 15, 1955. Table 1 also shows that the greatest number of outbreaks occurred in the county containing the largest number of hogs and garbage-feeding ranches (San Mateo).

Since one immunological type of VE virus appears to predominate during an enzootic, a study of outbreaks on individual ranches was made. Although the data are incomplete at the present time, they clearly show that the disease may be due to one immunological type which is found in the area but that a second attack occurring within the same herd is due to another immuno-type. In other instances, the same immunologic type of virus was identified in what appeared to be separate outbreaks at close intervals, but in each case so far studied it was found that the infection occurred in groups of apparently susceptible hogs which were recently introduced onto the premises.

TABLE I

IDENTIFICATION OF IMMUNOLOGICAL TYPE OF VESICULAR EXANTHEMA VIRUS INVOLVED IN 89 OUTBREAKS IN GARBAGE FEEDING ESTABLISHMENTS IN THE BAY AREA (CALIF.)

DATES	NO. OF OUTBREAKS	(Incomplete) IMMUNOLOGICAL TYPE		NUMBER IN COUNTY
		NO.	TYPE	
9 Oct. 1951 through 30 July 1952	12	10	B ₅₁	1 San Francisco 5 San Mateo
		2	US. 1/	3 Alameda 3 Contra Costa
3 Sept. 1952 through 12 Dec. 1952	17	13	C ₅₂	3 San Francisco 10 San Mateo
		4	US.	2 Alameda 1 Contra Costa 1 Santa Clara
21 Jan. 1953 through 18 Dec. 1953	16	14	B ₅₁	13 San Mateo
		1	C ₅₂ 2/	1 Alameda
		1	US.	1 Contra Costa 1 Santa Clara
22 Dec. 1953 through 2 Feb. 1954	7	5	C ₅₂	7 San Mateo
			US.	
26 Feb. 1954 through 15 Jan. 1955	33	2	B ₅₁ (4/8/54-AL.) (5/7/54-C.C.)	18 San Mateo
		1	C ₅₂ (3/6/54-S.M.)	9 Alameda
		12	D ₅₃	1 Contra Costa
		1	E ₅₄ 3/	5 Santa Clara
		17	?	

1/ Undesirable Sample - innocuous upon injection into hogs, insufficient tissue submitted.

2/ San Mateo County, 26 February 1953.

3/ Alameda County, isolated 7 August 1954.

African Swine Fever

Virus from three recent field cases have been obtained, stored, lyophilized, and fresh-frozen for investigational work. American hog cholera biological products have been used to see if they will produce any immunity or protection against African swine fever virus. To date, they have all failed. This has included the use of simultaneous methods, the use of anti-hog cholera hyperimmune serum in large dosages with modified live virus vaccines.

Several types of vaccines have been prepared from African swine fever virus and tested for immunizing value. Killed antigen vaccines, aluminum hydroxide, and crystal violet have been tested. In all cases, no protection was afforded.

To date, there has been no biologic developed that will provide immunity against African swine fever. The work, however, will continue.

INFORMATION PROGRAM AND TRAINING MATERIALS

We have presented the problems related to foreign animal diseases and their threat to the livestock industry of this country. What are we doing about them?

Early in 1954, a FCDA booklet* entitled "Civil Defense Against Biological Warfare" was prepared and distributed. This booklet contains general information on the subject of biological warfare against man, animals, and crops.

In the Fall of 1954, a FCDA booklet** entitled "What the Farmer Should Know About Biological Warfare" was distributed widely to the agricultural groups. This publication alerts the farmers to the dangers from foreign animal diseases and their responsibilities to help prevent the spread of such diseases if they should appear. It suggests means by which they can help protect their own livestock. It emphasizes the importance of promptly reporting unusual symptoms and disease conditions to their local veterinarians or to the State Livestock Sanitary Official.

Early this year, a FCDA booklet*** entitled "The Veterinarian in Civil Defense" was published and is being distributed at the present time to all practicing veterinarians through the State Livestock Sanitary Officials, veterinary students through the deans of veterinary colleges, and public health personnel through the U. S. Public Health Service. This booklet discusses very briefly the problems relating to atomic, chemical, and biological warfare as they might affect the food supply. It also includes a section on the affects of radiation on animals and also the responsibility of the veterinarian as a member of the medical services in providing first aid treatment to the large numbers of casualties that would result from an enemy attack on our cities. This booklet contains some useful references for more details on these subjects. It also includes a review of all colored sound movies on unusual or foreign animal diseases that are available through the Film Service of the USDA.

The U. S. Livestock Sanitary Association has prepared a booklet entitled "Foreign Animal Diseases, Their Prevention, Diagnosis and Control" which includes a brief description of over twenty-five foreign or unusual diseases that are looked upon as potential threats against the livestock industry in this country.

*)Available from local or State civil defense office or Government

**)Printing Office, Washington 25, D. C. Prices - \$.20, \$.15, and

***).15, respectively.

This handbook was prepared with the practitioner and regulatory people in mind and is concise in its presentation and includes a number of illustrations and charts that should be helpful in identifying foreign diseases if they should be suspected or appear. Instructions on the steps to take if a dangerous disease is suspected are contained in this booklet. The approved diagnostic procedures were included, together with information on the tissues that must be submitted to the laboratory with which a diagnosis would be made. Information on the preparation of these tissues for submission is also included. A short section on epizootiology of animal diseases has been prepared to provide suggestions to the practitioner, as well as regulatory official, that might be helpful in conducting investigation on the possible means of introduction and spread of the diseases. This handbook will sell for one dollar for single copies and sixty cents each in lots of ten or more. It can be obtained from the Secretary-Treasurer of the U. S. Livestock Sanitary Association, 1 West State Street, Trenton, New Jersey.

A number of colored sound movies have been obtained and prepared on unusual or foreign animal diseases. These have been reviewed in the several publications mentioned before and can be obtained from the Film Service, USDA, Washington, D. C., or from the AVMA office in Chicago. These films are available for showing in veterinary colleges and at veterinary meetings throughout the country. This program of visual aids is to be continued with several more films now in the process of production and several more planned to be developed.

With the cooperation of the Department of Defense, specifically the Armed Forces Institute of Pathology, a series of sets of 2" x 2" Kodachrome slides are being prepared showing the gross pathology and histopathology of various foreign animal diseases. A description and explanation of each slide will be included with these sets. It is planned to make the sets available for loan to veterinary colleges, diagnostic laboratories, and other technical groups that might be interested in using them for various meetings and discussions. Work is being carried out on this project now and it is hoped that these slides will be available at the beginning of the school year in the Fall of 1955.

A letter has been prepared and distributed by the ARS to all practitioners in which their attention is called to the emergency program and pointing out the need for their cooperation in making this emergency program successful. This will be followed in about six months with additional information to again remind the practitioner of his part in the animal disease control program.

Several radio scripts have been prepared and sent out over the national radio networks discussing very briefly the emergency problems as they affect animals and crops.

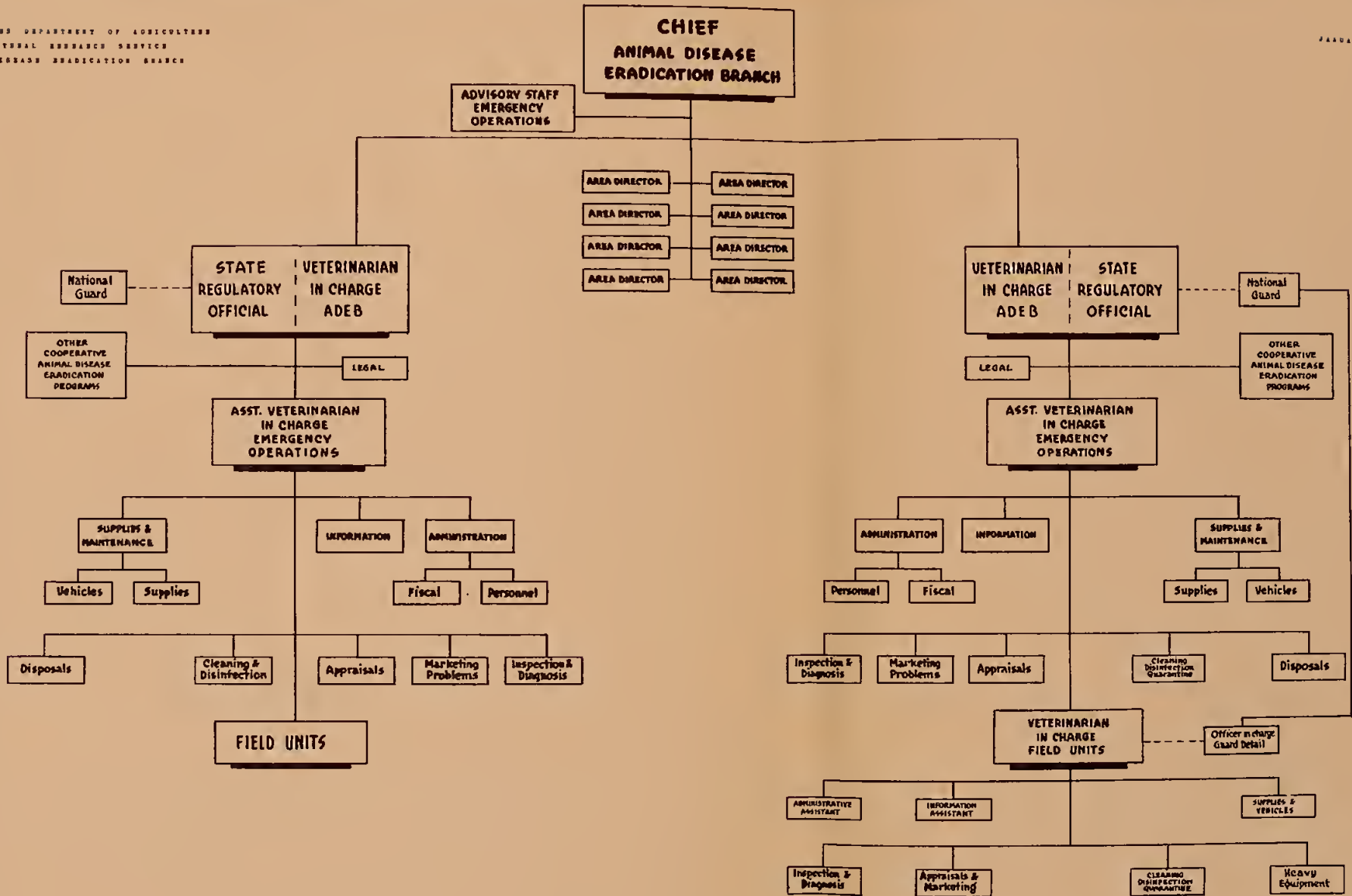
Extension editors in seven strategically located livestock States have been given emergency appointments to serve as Federal information officers in the event of an outbreak of an unusual or foreign disease. The emergency appointees are in the States of California, Georgia, Illinois, Montana, Nebraska, Texas, and Washington. Outbreaks in the Eastern States will be covered by personnel from the Information Division of the Department's Agricultural Research Service in Washington, D. C. Each appointee has been briefed on his responsibilities and how he will discharge them. Each appointee has also been furnished with a handbook which outlines his spheres of responsibility and action; it also includes pattern-type material for use in the various information media.

A reference book is being considered for newspaper, radio, and television reporters, which briefly presents the historical background, symptoms, means of treatment, and hazard to human health of 37 diseases considered to be of major economic importance to the livestock and poultry industries of the United States. Eight of the diseases are not present in this country. The handbook has been prepared to encourage a fuller knowledge among news reporters of the importance of disease in the livestock and poultry industries and to encourage factual, accurate reporting in the event of an outbreak without causing unnecessary concern among the population.

PROPOSED STATE, FEDERAL EMERGENCY DISEASE ERADICATION ORGANIZATION

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
ANIMAL DISEASE ERADICATION BRANCH

FEBRUARY 1, 1953



POULTRY DIAGNOSTIC LABORATORIES



